

WHAT IS CLAIMED IS:

1. A light-emitting device comprising:

a first emission layer formed apart from a light-emitting surface with a plurality of layers interposed therebetween, and having a first maximum wavelength region  $\lambda_x$ ; and

a second emission layer formed on said first emission layer to provide a laminated structure, the second emission layer having a second maximum wavelength region  $\lambda_y$  that is different from said first maximum wavelength region  $\lambda_x$ , wherein

a first optical film thickness range  $L_1$  from a light-emitting position of said first emission layer to said light-emitting surface of the device, a second optical film thickness range  $L_2$  from a light-emitting position of said second emission layer to said light-emitting surface, and respective film thicknesses of said plurality of layers, said first emission layer and said second emission layer are set, so as to increase the luminous intensity of color of an emission produced by mixing an emission from said first emission layer with an emission from said second emission layer.

2. The light-emitting device according to claim 1, wherein the optical film thickness range  $L_1$  from the light-emitting position of said first emission layer to said light-emitting surface of the device, the optical film

thickness range  $L_2$  from the light-emitting position of said second emission layer to said light-emitting surface, and the film thicknesses of said plurality of layers, said first emission layer and said second emission layer are set according to expressions as follows:

$$L_1 = \lambda_x / 4 \times m_1 = n_{11}d_1 + n_{21}d_2 + \dots + n_{k1}d_k$$

$$L_2 = \lambda_y / 4 \times m_2 = n_{12}d_1 + n_{22}d_2 + \dots + n_{k2}d_k$$

$m_1, m_2$ : positive integer equal to or larger than 1 (on conditions that decimal fractions of  $m_1$  and  $m_2$  are equal to or smaller than 0.2 or equal to or larger than 0.8)

$d_1, d_2, \dots d_k$  : film thickness of each layer

$n_{11}, n_{21}, \dots n_{k1}$ : index of refraction of each layer at  $\lambda_x$

$n_{12}, n_{22}, \dots n_{k2}$ : index of refraction of each layer at  $\lambda_y$ .

3. The light-emitting device according to claim 2, wherein the light-emitting position of said first emission layer is assumed to be one of the opposite surfaces of said first emission layer which is remote from said light-emitting surface of the device, and the light-emitting position of said second emission layer is assumed to be one of the opposite surfaces of said second emission layer which is remote from said light-emitting surface of the device.

4. The light-emitting device according to claim 1, wherein said plurality of layers comprise a substrate, a

transparent anode, a hole injecting layer and a hole transport layer.

5. The light-emitting device according to claim 1, wherein:

the first maximum wavelength region  $\lambda_x$  of said first emission layer comprises a maximum wavelength region  $\lambda_1$  of red color;

the second maximum wavelength region  $\lambda_y$  of said second emission layer comprises a maximum wavelength region  $\lambda_2$  of blue color and a maximum wavelength region  $\lambda_3$  of green color; and

said first optical film thickness range  $L_1$ , said second optical film thickness range  $L_2$  and the film thicknesses of said plurality of layers, said first emission layer and said second emission layer are set so as to increase the luminous intensity in the respective maximum wavelength regions of said red color, said green color and said blue color.

6. The light-emitting device according to claim 5, wherein:

said first emission layer comprises an orange emission layer;

said second emission layer comprises a blue emission layer; and

said first emission layer and the second emission layer

cooperate with each other to produce a white emission.

7. A light-emitting device comprising:

a first emission layer formed apart from a light-emitting surface with a plurality of layers interposed therebetween, and having a first maximum wavelength region  $\lambda_x$ ; and

a second emission layer formed on said first emission layer to provide a laminated structure, the second emission layer having a second maximum wavelength region  $\lambda_y$  that is different from said first maximum wavelength region  $\lambda_x$ , wherein

a first optical film thickness range  $L_1$  from a light-emitting position of said first emission layer to said light-emitting surface of the device, a second optical film thickness range  $L_2$  from a light-emitting position of said second emission layer to said light-emitting surface, and respective film thicknesses of said plurality of layers, said first emission layer and said second emission layer are set according to expressions as follows, so as to increase the luminous intensity of color of an emission produced by mixing an emission from said first emission layer with an emission from said second emission layer:

$$L_1 = \lambda_x / 4 \times m_1 = n_{11}d_1 + n_{21}d_2 + \dots + n_{k1}d_k$$

$$L_2 = \lambda_y / 4 \times m_2 = n_{12}d_1 + n_{22}d_2 + \dots + n_{k2}d_k$$

$m_1, m_2$ : positive integer equal to or larger than 1 (on conditions that decimal fractions of  $m_1$  and  $m_2$  are equal to or

smaller than 0.2 or equal to or larger than 0.8)

$d_1, d_2, \dots d_k$  : film thickness of each layer

$n_{11}, n_{21}, \dots n_{k1}$ : index of refraction of each layer at  $\lambda_x$

$n_{12}, n_{22}, \dots n_{k2}$ : index of refraction of each layer at  $\lambda_y$ .

8. A light-emitting device comprising:

a first emission layer formed apart from a light-emitting surface with a plurality of layers interposed therebetween, and having a first maximum wavelength region  $\lambda_x$ ; and

a second emission layer formed on said first emission layer to provide a laminated structure, the second emission layer having a second maximum wavelength region  $\lambda_y$  that is different from said first maximum wavelength region  $\lambda_x$ ,  
wherein

a first optical film thickness range  $L_1$  from a light-emitting position of said first emission layer to said light-emitting surface of the device, a second optical film thickness range  $L_2$  from a light-emitting position of said second emission layer to said light-emitting surface, and respective film thicknesses of said plurality of layers, said first emission layer and said second emission layer are set, so as to increase the luminous intensity in the first maximum wavelength region  $\lambda_x$  of an emission spectrum provided by said first emission layer, and increase the luminous intensity in the second maximum wavelength region  $\lambda_y$  of an emission spectrum

provided by said second emission layer.

9. The light-emitting device according to claim 8, wherein the optical film thickness range  $L_1$  from the light-emitting position of said first emission layer to said light-emitting surface of the device, the optical film thickness range  $L_2$  from the light-emitting position of said second emission layer to said light-emitting surface, and the film thicknesses of said plurality of layers, said first emission layer and said second emission layer are set according to expressions as follows:

$$L_1 = \lambda_x / 4 \times m_1 = n_{11}d_1 + n_{21}d_2 + \dots + n_{k1}d_k$$

$$L_2 = \lambda_y / 4 \times m_2 = n_{12}d_1 + n_{22}d_2 + \dots + n_{k2}d_k$$

$m_1, m_2$ : positive integer equal to or larger than 1 (on conditions that decimal fractions of  $m_1$  and  $m_2$  are equal to or smaller than 0.2 or equal to or larger than 0.8)

$d_1, d_2, \dots d_k$ : film thickness of each layer

$n_{11}, n_{21}, \dots n_{k1}$ : index of refraction of each layer at  $\lambda_x$

$n_{12}, n_{22}, \dots n_{k2}$ : index of refraction of each layer at  $\lambda_y$ .

10. The light-emitting device according to claim 9, wherein the light-emitting position of said first emission layer is assumed to be one of the opposite surfaces of said first emission layer which is remote from said light-emitting surface of the device, and the light-emitting position of said

second emission layer is assumed to be one of the opposite surfaces of said second emission layer which is remote from said light-emitting surface of the device.

11. The light-emitting device according to claim 8, wherein said plurality of layers comprise a substrate, a transparent anode, a hole injecting layer and a hole transport layer.

12. The light-emitting device according to claim 8, wherein:

the first maximum wavelength region  $\lambda_x$  of said first emission layer comprises a maximum wavelength region  $\lambda_1$  of red color;

the second maximum wavelength region  $\lambda_y$  of said second emission layer comprises a maximum wavelength region  $\lambda_2$  of blue color and a maximum wavelength region  $\lambda_3$  of green color; and

said first optical film thickness range  $L_1$ , said second optical film thickness range  $L_2$  and the film thicknesses of said plurality of layers, said first emission layer and said second emission layer are set so as to increase the luminous intensity in the maximum wavelength regions of said red color and said blue color.

13. The light-emitting device according to claim 12,

wherein:

said first emission layer comprises an orange emission layer;

said second emission layer comprises a blue emission layer; and

said first emission layer and said second emission layer cooperate with each other to produce a white emission.

14. A light-emitting device comprising:

a first emission layer formed apart from a light-emitting surface with a plurality of layers interposed therebetween, and having a first maximum wavelength region  $\lambda_x$ ; and

a second emission layer formed on said first emission layer to provide a laminated structure, the second emission layer having a second maximum wavelength region  $\lambda_y$  that is different from said first maximum wavelength region  $\lambda_x$ , wherein

a first optical film thickness range  $L_1$  from a light-emitting position of said first emission layer to said light-emitting surface of the device, a second optical film thickness range  $L_2$  from a light-emitting position of said second emission layer to said light-emitting surface, and respective film thicknesses of said plurality of layers, said first emission layer and said second emission layer are set according to expressions as follows, so as to increase the luminous intensity in the first maximum wavelength region  $\lambda_x$



of an emission spectrum provided by said first emission layer, and increase the luminous intensity in the second maximum wavelength region  $\lambda_y$  of an emission spectrum provided by said second emission layer:

$$L_1 = \lambda_x / 4 \times m_1 = n_{11}d_1 + n_{21}d_2 + \dots + n_{k1}d_k$$

$$L_2 = \lambda_y / 4 \times m_2 = n_{12}d_1 + n_{22}d_2 + \dots + n_{k2}d_k$$

$m_1, m_2$ : positive integer equal to or larger than 1 (on conditions that decimal fractions of  $m_1$  and  $m_2$  are equal to or smaller than 0.2 or equal to or larger than 0.8)

$d_1, d_2, \dots d_k$  : film thickness of each layer

$n_{11}, n_{21}, \dots n_{k1}$ : index of refraction of each layer at  $\lambda_x$

$n_{12}, n_{22}, \dots n_{k2}$ : index of refraction of each layer at  $\lambda_y$ .